REMARKS

Claims 5-11, 14 and 20 are pending in this application. By this Amendment, claims 5-11, 14 and 20 are amended. Reconsideration in view of the following remarks is respectfully requested.

Applicants appreciate the Examiner's consideration of the Information Disclosure Statements (IDS). However, the IDS filed with the application on January 23, 2004 included three PTO-1449's, and Applicants only received the first PTO-1449. Enclosed are the two remaining PTO-1449's from the January 23, 2004 IDS. The Examiner is respectfully requested to initial each reference, sign and date the PTO-1449's and return copies with the next Office Action in accordance with MPEP § 609.

Claims 5, 7-11, 14 and 20 were rejected under 35 U.S.C. § 103(a) over Holler et al. (U.S. Patent No. 5,268,320) in view of Ahn et al. (U.S. Patent No. 6,297,103). The rejection is respectfully traversed.

According to the invention of claim 5, by providing a first electrode having a (111) oriented surface, the polysilicon of the first electrode is dense and is of a good quality. As a result, the silicon oxide formed on the (111) oriented surface of the first electrode is also of a high-quality.

The Examiner acknowledges that Holler et al. do not disclose forming the silicon oxide films by supplying a gas containing oxygen and a gas predominantly of Kr into the processing chamber and exciting plasma in the processing chamber by a microwave. The Examiner alleges that Ahn et al. disclose, in column 5, lines 20-47, forming a silicon oxide film by supplying a gas containing oxygen and a gas predominantly of Kr into a processing chamber, and exciting plasma in the chamber by a microwave. The Examiner also alleges that Ahn et al. disclose forming a silicon oxide film by exposing a silicon oxide film deposited by a CVD process formed by the microwave plasma method, in column 6, line 56 – column 7, line 3. The Examiner concludes that in view of this disclosure, it would have been obvious to combine Holler et al. and Ahn et al. to achieve a high growth rate at a low temperature.

It is respectfully submitted that there is no motivation or suggestion, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine Holler et al. and Ahn et al. It is also respectfully submitted that Ahn et al. fail

to cure the deficiencies of Holler et al. with respect to claim 5 and that even assuming it would have been obvious to combine the references, the combination would not include all the limitations of claim 5.

Ahn et al. merely discloses structures and methods for dual gates oxides on a single substrate. As disclosed by Ahn et al., silicon oxide films were grown by direct oxidation of a silicon surface by using a mixture of oxygen and Kr. Ahn et al. does not disclose, teach or suggest, for example, "supplying a gas containing oxygen and a gas predominantly of Kr into a processing chamber, and exciting plasma in said processing chamber by a microwave to form said silicon oxide film on a (111) oriented surface of said first electrode," as recited in claim 5. Ahn et al. disclose that the process described by Yuji Saito et al. in "High-Integrity Silicon Oxide Grown at Low-Temperatures by Atomic Oxygen Generated in High-Density Krypton Plasma," was used. A copy of the Saito et al. article is attached.

Among other features, Ahn et al. does not disclose, teach or suggest that the silicon surface has a (111) orientation. Consequently, neither Holler et al. nor Ahn et al., alone or in combination, disclose, teach or suggest the subject matter recited in claim 5. As a result, it is respectfully submitted that the rejection should be withdrawn.

Claim 7 recites, *inter-alia*, "introducing a gas containing oxygen and a gas predominantly of Kr into a processing chamber, and exciting plasma in said processing chamber by a microwave to form said first silicon oxide film on a (111) oriented surface of said first electrode and to form said second silicon oxide film on said silicon nitride."

The Examiner concedes that Holler et al. does not disclose forming the silicon oxide films by supplying a gas containing oxygen and a gas predominantly of Kr into the processing chamber and exciting plasma in the processing chamber by a microwave. As noted above, Ahn et al. is similarly deficient. Ahn et al. merely discloses structures and methods for dual gates oxides on a single substrate. Consequently, neither Holler et al. nor Ahn et al., alone or in combination disclose, teach or suggest the subject matter recited in claim 7. As a result, it is respectfully requested that the rejection be withdrawn.

Claim 8 recites, *inter-alia*, "a flash memory device, said flash memory device comprising a silicon substrate, a first electrode formed on said silicon substrate with an insulation film interposed therebetween, and a second electrode formed on said first electrode with a inter-electrode insulation interposed therebetween, said inter-electrode insulation film having a two-layer structure in which a silicon oxide film and a silicon nitride film are stacked consecutively, said first electrode having a polysilicon surface."

As pointed out in connection with claim 6, Holler et al. merely discloses "an inter-electrode insulation" interpoly dielectric which is formed of three layers: silicon dioxide layer 26, silicon nitride layer 27 and silicon dioxide layer 29 (see col. 5, lines 35-40 and Figure 3 in Holler et al.). Holler et al. "inter-electrode insulation" does not have a two-layer structure in which a silicon oxide film and a silicon nitride film are stacked consecutively, as required by claim 8. Furthermore, as conceded in the Office Action, Holler et al. does not disclose forming the silicon oxide films by supplying a gas containing oxygen and a gas predominantly of Kr into the processing chamber and exciting plasma in the processing chamber by a microwave.

Ahn et al. fails to cure the deficiencies noted above in Holler et al. Ahn et al. does not disclose, teach or suggest an inter-electrode insulation film having a two-layer structure in which a silicon oxide film and a silicon nitride film are stacked consecutively, as recited in claim 8. Even if one were to use the method of Ahn et al. of growing silicon oxide films by direct oxidation of a silicon surface using a mixture of oxygen and Kr, to make the gate memory device of Holler et al., which Applicants do not concede, the resulting memory device would have a different structure as the "inter-electrode insulation" in the device of Holler et al. is merely a stack of three layers (silicon dioxide layer 26, silicon nitride layer 27 and silicon dioxide layer 29). The "inter-electrode insulation" in the device of Holler et al. is not a two-layer structure in which a silicon oxide film and a silicon nitride film are stacked consecutively.

Consequently, neither Holler et al. nor Ahn et al., alone or in combination, disclose, teach or suggest the subject matter recited in claim 8. Accordingly, it is respectfully submitted that the rejection of claim 8 should be withdrawn.

Claim 9 recites, *inter-alia,* "exposing a silicon oxide film deposited on said at least one silicon nitride film by a CVD process to atomic state oxygen O* formed by microwave excitation of plasma in a mixed gas of an oxygen-containing gas and an inert gas predominantly of a Kr gas." As conceded in the Office Action, Holler et al. does not disclose forming silicon oxide films by supplying a gas containing oxygen and a gas predominantly of Kr. The Examiner contends that Ahn et al. teaches forming a silicon oxide 104B deposited by a CVD process formed by microwave excitation of plasma in a mixed gas of an oxygen-containing gas and an inert gas predominantly of a Kr gas. Applicants respectfully disagree.

Contrary to Examiner's contention, Ahn et al. does not disclose forming a silicon oxide by exposing a silicon oxide film deposited on said at least one silicon nitride film by a

CVD process to atomic state oxygen O* formed by microwave excitation of plasma in a mixed gas of an oxygen-containing gas and an inert gas predominantly of a Kr gas. Moreover, Ahn et al. does not disclose, teach or suggest using a CVD (chemical vapor deposition method) to form a silicon oxide at all. Indeed, in Ahn et al., the silicon oxide 104A and 104B are formed by direct oxidation of the silicon surface via atomic oxygen generated in a plasma with a mixture of oxygen and Kr. Ahn et al. does not form a silicon oxide layer via a CVD process and then expose the silicon oxide layer formed by the CVD process to atomic state oxygen O* formed by microwave excitation of plasma in a mixed gas of an oxygen-containing gas and an inert gas predominantly of a Kr gas. As a result, Applicants respectfully submit that neither Holler et al. nor Ahn et al., alone or in combination, disclose, teach or suggest the subject matter recited in claim 9. Applicants, therefore, respectfully request that the Examiner withdraw the rejection of claim 9.

Claim 10 recites, *inter-alia*, "said inter-electrode insulation film having a stacked structure in which a first silicon nitride film, a first silicon oxide film, a second silicon nitride film and a second silicon oxide film are stacked consecutively, said first electrode having a polysilicon surface, the method comprising: forming said first and second silicon oxide films by a process comprising: exposing a silicon oxide film deposited by a CVD process to atomic state oxygen O* formed by exciting plasma in a mixed gas of a gas containing oxygen and a gas predominantly of a Kr gas, by a microwave."

As conceded in the Office Action, Holler et al. does not disclose forming silicon oxide films by supplying a gas containing oxygen and a gas predominantly of Kr. As Applicants have already noted, Holler et al. merely discloses "an inter-electrode insulation" interpoly dielectric which is formed of three layers: silicon dioxide layer 26, silicon nitride layer 27 and silicon dioxide layer 29 (see col. 5, lines 35-40 and Figure 3 in Holler et al.). Holler et al.' s "inter-electrode insulation" does not have a stacked structure in which a first silicon nitride film, a first silicon oxide film, a second silicon nitride film and a second silicon oxide film are stacked consecutively. Contrary to Examiner's contention, and as discussed above, Ahn et al. does not disclose forming a silicon oxide by exposing a silicon oxide film deposited on said at least one silicon nitride film by a CVD process to atomic state oxygen O* formed by microwave excitation of plasma in a mixed gas of an oxygen-containing gas and an inert gas predominantly of a Kr gas.

Consequently, neither Holler et al. nor Ahn et al., alone or in combination, disclose, teach or suggest the subject matter recited in claim 10. Accordingly, Applicants respectfully request that the Examiner withdraw the rejection of claim 10.

Claims 11 and 14 recite, *inter-alia*, "exposing a silicon oxide film deposited by a CVD process to atomic state oxygen O* formed by exciting plasma in a mixed gas of a gas containing oxygen and a gas predominantly of a Kr gas by a microwave."

As conceded in the Office Action, Holler et al. does not disclose forming silicon oxide films by supplying a gas containing oxygen and a gas predominantly of Kr. The Examiner contends that Ahn et al. teaches forming a silicon oxide 104B deposited by a CVD process formed by microwave excitation of plasma in a mixed gas of an oxygen-containing gas and an inert gas predominantly of a Kr gas. Applicants respectfully disagree as discussed above in connection with claim 9.

Consequently, Applicants respectfully submit that neither Holler et al. nor Ahn et al., alone or in combination, disclose, teach or suggest the subject matter recited in claims 11 and 14. Applicants, therefore, believe that the Examiner should withdraw the rejection with respect to claims 11 and 14

Claim 20 recites, *inter-alia*, "exposing a (111) oriented surface of said polysilicon film to atomic state oxygen O* formed by exciting plasma in a mixed gas of a gas containing oxygen and an inert gas predominantly of a Kr gas by a microwave to form said inter-electrode oxide film."

The Examiner concedes that Holler et al. does not disclose forming silicon oxide films by supplying a gas containing oxygen and a gas predominantly of Kr into the processing chamber and exciting plasma in the processing chamber by a microwave. As stated above, Ahn et al. merely discloses structures and methods for dual gates oxides on a single substrate. Ahn et al. fails to cure the deficiencies noted above in Holler et al. In Ahn et al. silicon oxide films were grown by direct oxidation of a silicon surface by using a mixture of oxygen and Kr.

Consequently, neither Holler et al. nor Ahn et al., alone or in combination disclose, teach or suggest the subject matter recited in claim 20.

Reconsideration and withdrawal of the rejection of claims 5, 7-11, 14 and 20 over Holler et al. in view of Ahn et al. are respectfully requested.

Claim 6 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Mori et al. (U.S. Patent No. 5,304,829) in view of Ahn et al. The rejection is respectfully traversed.

Claim 6 recites, *inter-alia*, "inter-electrode insulation film having a stacked structure in which a first silicon nitride film, a first silicon oxide film, a second silicon nitride film and a second silicon oxide film are stacked consecutively, said first electrode having a polysilicon surface, the method comprising: forming said first and second silicon oxide films by a process comprising: introducing a gas containing oxygen and a gas predominantly of Kr into a processing chamber, and exciting plasma in said processing chamber by a microwave to form said first silicon oxide film on said first silicon nitride film and to form said second oxide film on said second silicon nitride film."

As conceded in the Office Action, Mori et al. does not disclose forming the silicon oxide film by supplying a gas containing oxygen and a gas predominently of Kr into a processing chamber, and exciting plasma in the processing chamber by a microwave.

Ahn fails to cure the deficiencies noted above in Mori et al. Indeed, Ahn et al. merely discloses structures and methods for dual gates oxides on a single substrate. In Ahn et al. silicon oxide films were grown by direct oxidation of <u>a silicon surface</u> by using a mixture of oxygen and Kr. In Ahn et al., the silicon oxide 104A and 104B are formed <u>by direct oxidation</u> of <u>the silicon surface</u> via atomic oxygen generated in a plasma with a mixture of oxygen and Kr. Ahn et al. does <u>not</u> disclose, teach or suggest forming a silicon oxide film via a plasma using a mixture of oxygen and Kr <u>on a silicon nitride film</u>.

Therefore, one of ordinary skill in the art would not have been motivated to combine the method of growing silicon oxide films <u>on a silicon substrate</u> of Ahn et al. with the method of forming an interlayer insulating film of a NONO structure of Mori et al. to arrive at the invention of claim 6.

Reconsideration and withdrawal of the rejection of claim 6 under § 103(a) over Mori et al. in view of Ahn et al. are respectfully requested.

In view of the foregoing, the claims are now in form for allowance, and such action is hereby solicited. If any point remains in issue which the Examiner feels may be best resolved through a personal or telephone interview, he is kindly requested to contact the undersigned at the telephone number listed below.

All objections and rejections having been addressed, it is respectfully submitted that the present application is in a condition for allowance and a Notice to that effect is earnestly solicited.

Respectfully submitted,

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Attachments: January 23, 2004 PTO-1449's and Y. Saito et al. ("High-Integrity...)

JPD/bhs